

Personal Property Management - Requirements
01/27/2000

NOAA - Property Management Requirements

Table of Contents

Executive Summary	4
Current Property Management Processes	5
Acquisition Processes	5
Bank Card Acquisitions	5
Purchase Order Acquisitions	9
Contract Acquisitions	12
Accountability Processes	15
Financial Accountability	15
Physical Accountability	18
Disposal Processes	21
Functional Requirements	25
Acquisitions	26
Accountability	27
Disposal	28
Ad-Hoc query environment	29
Barcode Application Layer	29
General Functions and Utilities	30
Training	31
Technical Requirements	32
Database Layer	32
Application	33
Client Layer	34
Infrastructure	36
Application Architecture	38
Proposed Sub-Systems	38
User Interface	40
External Interfaces	40
Utilities	43
Security	43
Ad-hoc queries	43
Technical Architecture	44
Database Server Architecture	44
Application Logic Architecture	44
Client (user interface) Architecture	45

January 27, 2000

NOAA - Property Management Requirements

Barcode Architecture	46
Network and Communications Infrastructure	46
Hardware Components	46
Software Components	47
Disaster Recovery Components	47
Software Development Environment Requirements	51
SDE	51

NOAA - Property Management Requirements

Executive Summary

The National Oceanic and Atmospheric Administration (NOAA), a Bureau of the Department of Commerce (DoC) is seeking to improve its management of personal property by streamlining the current processes and building a new information system to support these processes. The purpose of this document is to define the requirements of a system that will meet NOAA's goals for managing personal property.

Personal property is defined in the Code of Federal Regulations Part 41, 101-43.001-23 as "any property, except real property, records of the Federal Government, or naval vessels . . .". The management of property consists of processes for recording, accounting, tracking, depreciating, disposing, archiving and reporting of personal property. The property system will provide functionality and support for these processes and provide integration with other NOAA applications that interact with these processes.

There are several key drivers for building this system. The first is to support the accurate accounting of personal property on the agency's financial statements. This is critical in order to meet the requirements set forth in the Federal Accounting Standards Advisory Board (FASAB) standards, General Services Administration regulations, and the DoC's policies and procedures for managing property. In accordance with GAO Title 2, the DoC Personal Property Management Manual, the DoC Accounting Handbook, and the DoC Financial Internal Control Standards, the financial records and personal property records must be accurate and in agreement. An adequate system of internal controls is necessary to provide a framework to help ensure that personal property transactions and resulting accounting transactions are executed in accordance with prescribed standards and procedures and that financial statements accurately reflect the results of operations and the current financial position.

Other key requirements are to improve the accuracy of information by reducing the number of data errors and also eliminating the need to use paper to record property information and thus double entry of data. A new system should also allow NOAA to reduce the workload required to manage property by eliminating labor intensive administrative steps imposed by the current processes and legacy systems.

NOAA - Property Management Requirements

Current Property Management Processes

This section describes the processes related to a piece of property as it goes through its life cycle from acquisition through disposal. The purpose is to give a reader a high level understanding of the main processes associated with Personal Property management. These are high level processes only and do not address every possible change in a piece of property or all of the data associated with them.

The following acronyms and terms are introduced in this section. These can also be found in the glossary.

ASC – Administrative Support Centers

CAMS – Commerce Administrative Management System

CSPS - CAMS Small Purchasing System

FIMA - The current financial system that will be replaced by CAMS

NFC – National Finance Center (the existing Property Management System)

PAO - Property Accountability Officer

PC – Property Custodian

PM - Program Manager

PO - Purchase Order

PP - Procurement Point

PRS – Property Reconciliation System. (A system in use at the ASC's to track and reconcile PO's)

RPM - Regional Property Manager and Offices (4 ASC's + headquarters)

SPS - Small Purchasing System

UPR – Unreconciled Procurement Report

WASC - Western ASC office

Acquisition Processes

There are several mechanisms for acquiring a piece of personal property including purchase orders, use of a bank card, through a contract, inter-agency transfers, and others. This section will define the process for the three primary mechanisms: bank cards, purchase orders and contracts.

Bank Card Acquisitions

These are acquisitions made using bank cards that do not require a purchase requisition etc. Approximately 450 property acquisitions a month take place using bank cards.

NOAA - Property Management Requirements

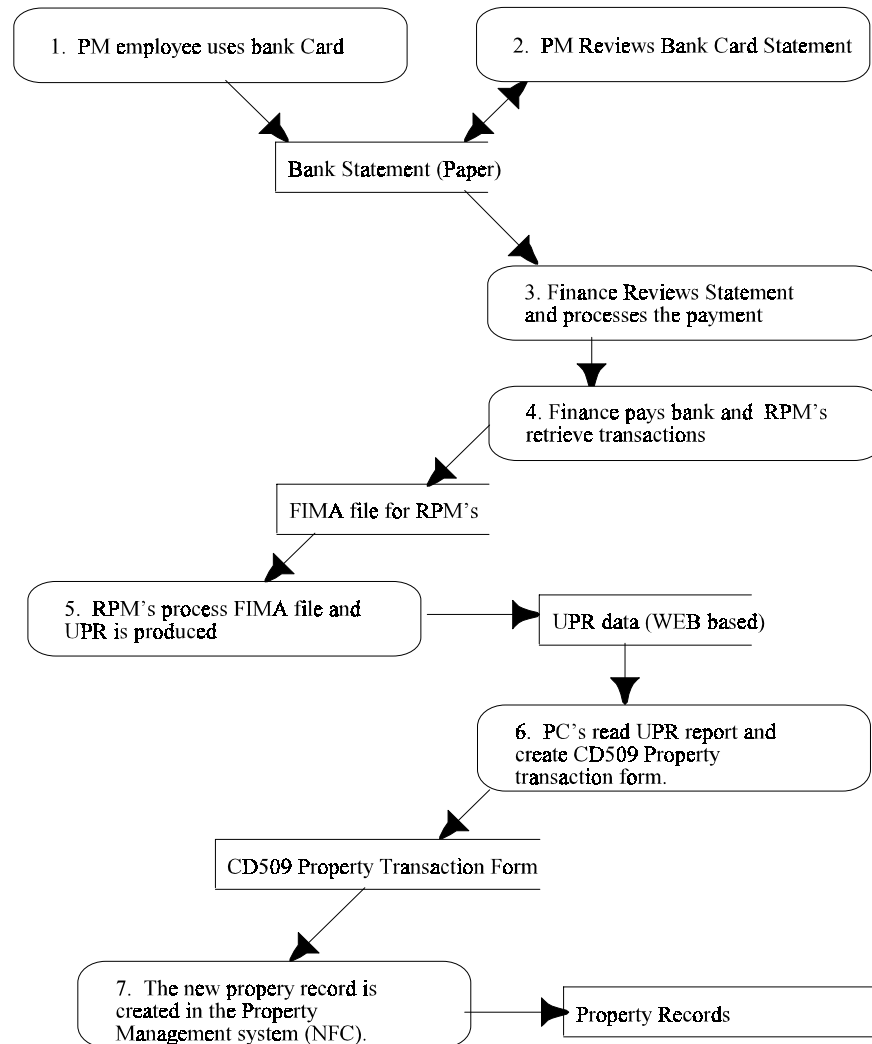
Process Step	Current Process	Potential Process
1. A Program Manager (PM) initiates a bank card acquisition.	A PM employee makes a purchase using a bank card.	No Change
2. PM reviews bank card statement	The PM reviews the paper statement and adds comments to help finance code the statement. They then forward the statement to the finance dept.	An on-line review process (e.g. bank card component of CAMS) that provides some business logic that helps the PM assign the proper object class to purchases.
3. Finance department receives the bank card statement and encodes the transactions for payment.	The “paper” statement is received and the finance department enters these items into FIMA using the organization code, task code, and object class.	CAMS receives an electronic equivalent of the coded bank card statement.
4. Finance dept. accounts for the amount paid to the bank by assessing organization codes and tasks for their portions.	A file is produced from FIMA that can be used for reconciliation. There are currently issues around the lack of a “noun” to identify the property and the use of the proper object class (E.g., 31XX).	The new bank card system could hopefully clean up some of the data problems around the object class code and add fields such as “custodial area” and the “noun”.
5. The Property Offices produce the initial property management document used to record the new property (i.e. the “Pink Sheet”)	The Property Offices use the PRS system to produce the initial property “pink sheets” that are mailed out to the PC. The “pink sheets” are then completed by the PC when they receive the property and mailed back into the Property Office.	The new property management system should be able to automatically create a skeleton property record from the bank card statement. The PC’s in the field should have on-line access to the property master record where they can enter their data.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
6. The Property Offices retrieve the bank card transactions from Finance and the unreconciled acquisitions are reported.	An Unreconciled Procurement Report (UPR) sorted by organization code or document number is produced and published on the WEB (i.e. WASC) for review by Property Custodians (PC's).	The skeleton property record will need to be completed by the bank card holder or the administrative support in the Property Custodian's office to complete the reconciliation process.
7. Property Custodians read the UPR report and fill out a Property Acquisition form and send it into the Property Office.	A CD509 Property Transaction form is filled out (paper based). This requires entry of approx. 10 data elements.	The PC's or bank card holders should be able to fill out an electronic version of this form immediately after the property has been received. There should only be an additional 4-5 pieces of information that they are required to enter.
8. The new property record is created in the property management system.	The Property Offices key the CD509's into the existing property management system (NFC).	The new property master record should now be automatically created/updated in the system earlier in the process, with only an on-line review required by the Property Office's staff.

NOAA - Property Management Requirements

Bank Card Acquisition Process (existing)



NOAA - Property Management Requirements

Purchase Order Acquisitions

These are acquisitions made using a purchase requisition (CD-435) that in turn becomes a purchase order (CD-404). Approximately 575 property acquisitions a month take place using purchase orders.

Process Step	Current Process	Potential Process
1. A program manager (PM) has approved a purchase requisition (CD-435) for the purchase of a new property.	A paper purchase requisitions form (CD435) is filled out and passed on either to a procurement office or a procurement point (PP) or to the Property Offices for verification.	It is important that as much descriptive data is passed along as possible so the correct "object class code", "custodial area" and accounting strip can be assigned to this property.
2. Procurement Office processes the purchase requisition and produces a Purchase Order (PO).	A PO is created as a paper form (CD-404). A weekly electronic archive of all PO's is sent to the finance dept. (FIMA). The file is also retrieved by the Property Offices. The electronic file lacks some of the descriptive information necessary to properly code the property (E.g. product service code). (See glossary)	An on-line system that provides some business logic that helps verify the object class code. This should be a component of CAMS or the new purchasing system.

NOAA - Property Management Requirements

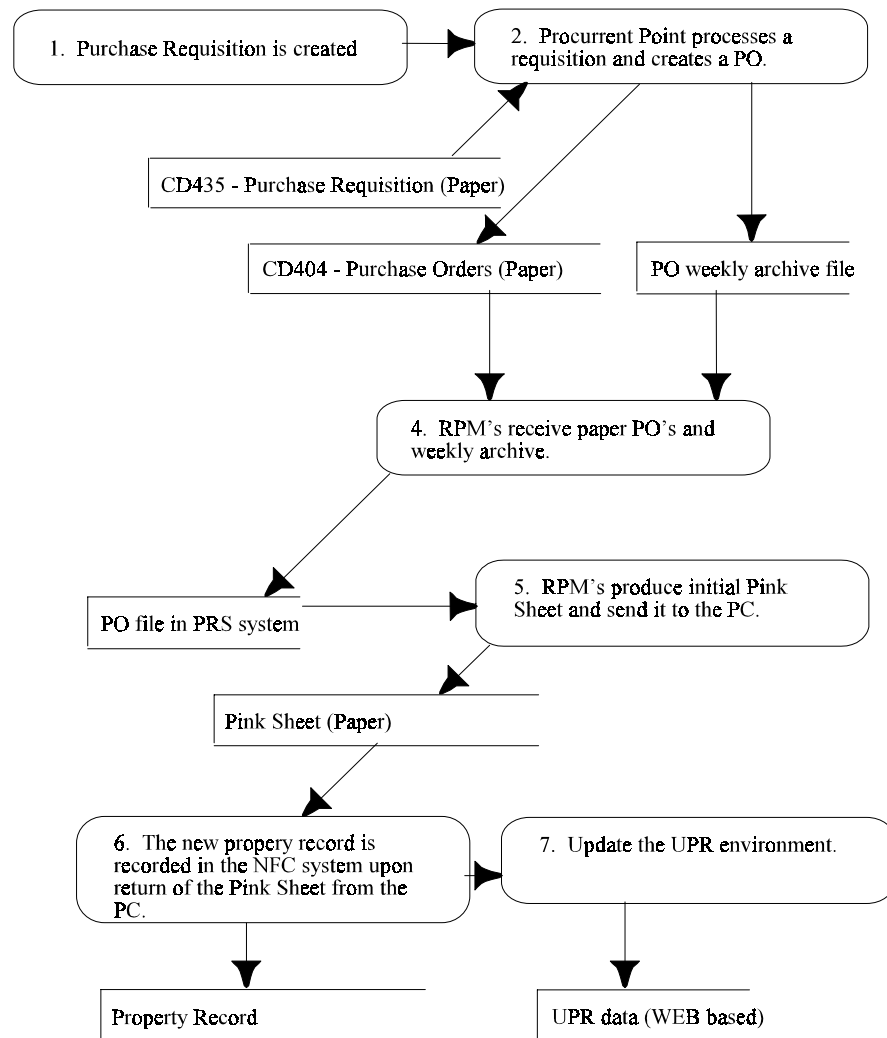
Process Step	Current Process	Potential Process
3. The procurement office sends the purchase order information to the Property Offices.	The blue copy of ALL PO's is sent to the Property Offices and they sort through those that should be entered into the property system. A weekly electronic archive file is also retrieved from the SPS system. The Property Offices reconcile the PO's from SPS and enter the PO's into the PRS system.	An electronic transfer of the PO data specifically for property is made available to be transferred from CAMS to the property management system with the proper coding (i.e. custodial area, object class code). At this point a new property record can be created in the property management system with a minimum of data entry.
4. The Property Offices produce the initial property management document used to record the new property (i.e. the "Pink Sheet")	The Property Offices use the PRS system to produce the initial property "pink sheets" that are mailed out to the PC. The "pink sheets" are then completed by the PC when they receive the property and mailed back into the Property Office.	The new property management system should enable the Property Office to create a skeleton property record from the PO (see step 3 above). The PC's in the field should have on-line access to the property master record where they can enter their data.
5. The new property is created on the property management system.	The PRS system produces an electronic file of "pink sheets" that are either uploaded into the existing property management system (NFC) once the paper version is received from the PC or keyed into the NFC system.	Not necessary to create the record. The Property Office reviews the record to ensure compliance with policies and procedures.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
6. Update the UPR environment	For those “pink sheets”/properties that have not been returned by the PC’s the UPR system is updated. This system is used by the Property Offices as an internal control to identify delinquent Property Custodians.	The UPR system should be replaced/built into the new property management system and this information should be accurate at all times. That is, as soon as a property record is created the PC’s should be alerted to its existence.

NOAA - Property Management Requirements

Purchase Order Acquisition Process (existing)



NOAA - Property Management Requirements

Contract Acquisitions

These are the steps required to record the acquisition of personal property that are part of a contract (e.g. building a ship). Approximately 125 personal property items per month are acquired through contracts.

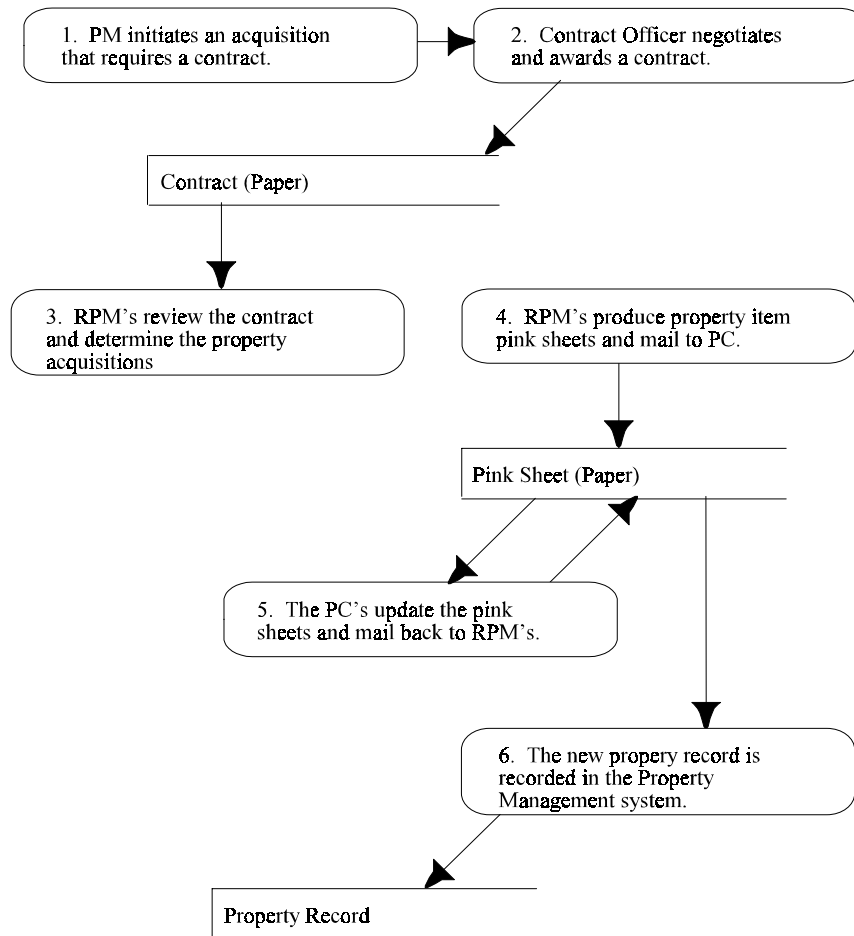
Process Step	Current Process	Potential Process
1. A PM or their employees initiates an acquisition that requires a contract.	Paper based	Same
2. A Contract Officer negotiates and awards a contract.	On awarding of the contract a copy is sent to the Property Office.	Same
3. The Property Offices review the contract to determine what personal property will have to be acquired.	The Property Offices manually review new contracts to determine all of the personal property items that will have to be tracked.	There is probably no automated way of reviewing the contract so this process will remain the same.
4. The Property Offices produce skeleton property item "pink sheets".	For all personal property items identified in the contract a "pink sheet" is created and mailed to the applicable PC's.	The Property Office should have an on-line system that provides business logic that helps verify the object code, custodial area and creates the property record. There should be no need to produce paper and mail it to the PC's.
5. The PC's update the "pink sheets".	The PC's update the "pink sheets" when they receive a piece of property and mail the sheets back to the Property Office.	The PC's should have an on-line mechanism that allows them to view and update all property records that apply to their custodial area. The system should have business logic that reduces the number of errors during data entry.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
6. A property management record is created in the system.	Once the “pink sheet” is returned from the PC then the Property Office can enter the record into the NFC property system.	The Property Offices should only have to review/approve the updated property records.

NOAA - Property Management Requirements

Contract Acquisition Process (existing)



NOAA - Property Management Requirements

Accountability Processes

There are two types of accountability that the Property management system must address. The first is financial accounting, which is tracking the original cost, depreciation, and current book value. The second is physical accountability, which is who received the property, where is it located, what is its condition and who tracks it in inventory.

Financial Accounting

Financial accounting begins when a piece of property is acquired via a method that obligates NOAA to spend money. The financial systems will track the liability and pay for the property as it is received and accepted. The property system needs to receive the cost information from the financial system in order to assign and track the proper cost for a piece of property. One of the primary purposes for the property system in this area is to track costs for calculating depreciation on capitalized property. Another is to ensure that all moneys expended for accountable property are accounted for.

Process Step	Current Process	Potential Process
1. Property is acquired via a purchase order, contract or bank card.	The current financial system maintains the obligations for the property. Quite often the property has been miss-classified with the wrong object code, which creates bad data in the current property system.	The new system should help catch mis-classified purchases before the data enters the financial systems by putting in place review processes that ensure correct accounting before obligations are established.
2. The property is received and accepted by the PM.	The date the product is accepted becomes the acquisition date and is required to calculate depreciation. This date is not known by the Property Offices until the "pink sheet" is returned.	Acceptance of the product should be recorded on-line, which would trigger the proper depreciation to begin immediately.

NOAA - Property Management Requirements

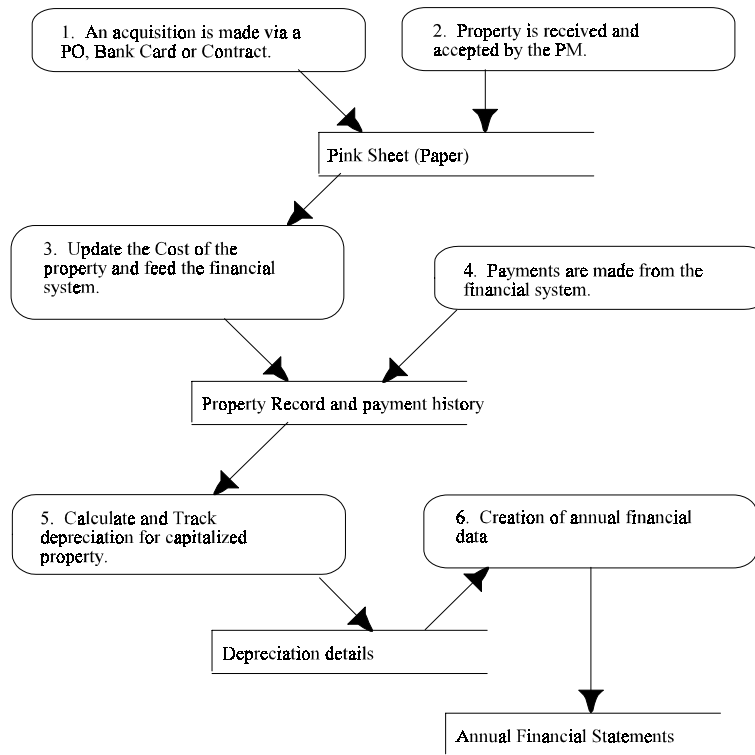
Process Step	Current Process	Potential Process
3. The cost of the property and acquisition data is updated and “back feeds” the financial system.	The cost of the property can be modified in the property system and an adjustment must be sent back to FIMA for capitalized property.	This should be streamlined by establishing automated interfaces between Property and the Core Finance System such that when Property makes a change to a property record that affects the Finance records, the Finance system is automatically updated with minimum human interaction.
4. Payments are made from the financial system.	When an invoice or receiving report is received the financial system makes a payment. These can be partial payments. The property system needs to track the actual payment amounts in order to accurately track the cost of the property.	An efficient interface between the financial systems and the property management system should improve this process.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
5. Calculate and Track Depreciation	<p>This is a complex task, but basically once capitalized property has been accepted it begins to depreciate. It can become complex when upgrades are made to a property item, and depreciation needs to be calculated for both the original property and its upgrades. Depreciation is calculated on a daily basis and is used to calculate the current net book value of capitalized property. The current NFC system does not handle this. Instead it is accomplished with another WEB based system. The depreciation amounts are sent back to the financial system on a regular basis.</p>	<p>Although this will be complex, the system should be able to accurately calculate depreciation for all possible scenarios. This should eliminate manual calculation of depreciation and improve the timeliness of providing this information to the financial system.</p>
6. Creation of annual financial data in order to produce the Annual Financial Statement.	<p>Currently the data required to complete this task is difficult to gather since it is spread across several sub-systems.</p>	<p>A new system that is fully integrated with other NOAA systems and that contains clean data will simplify this task..</p>

NOAA - Property Management Requirements

Financial Accountability Process (existing)



NOAA - Property Management Requirements

Physical Accountability

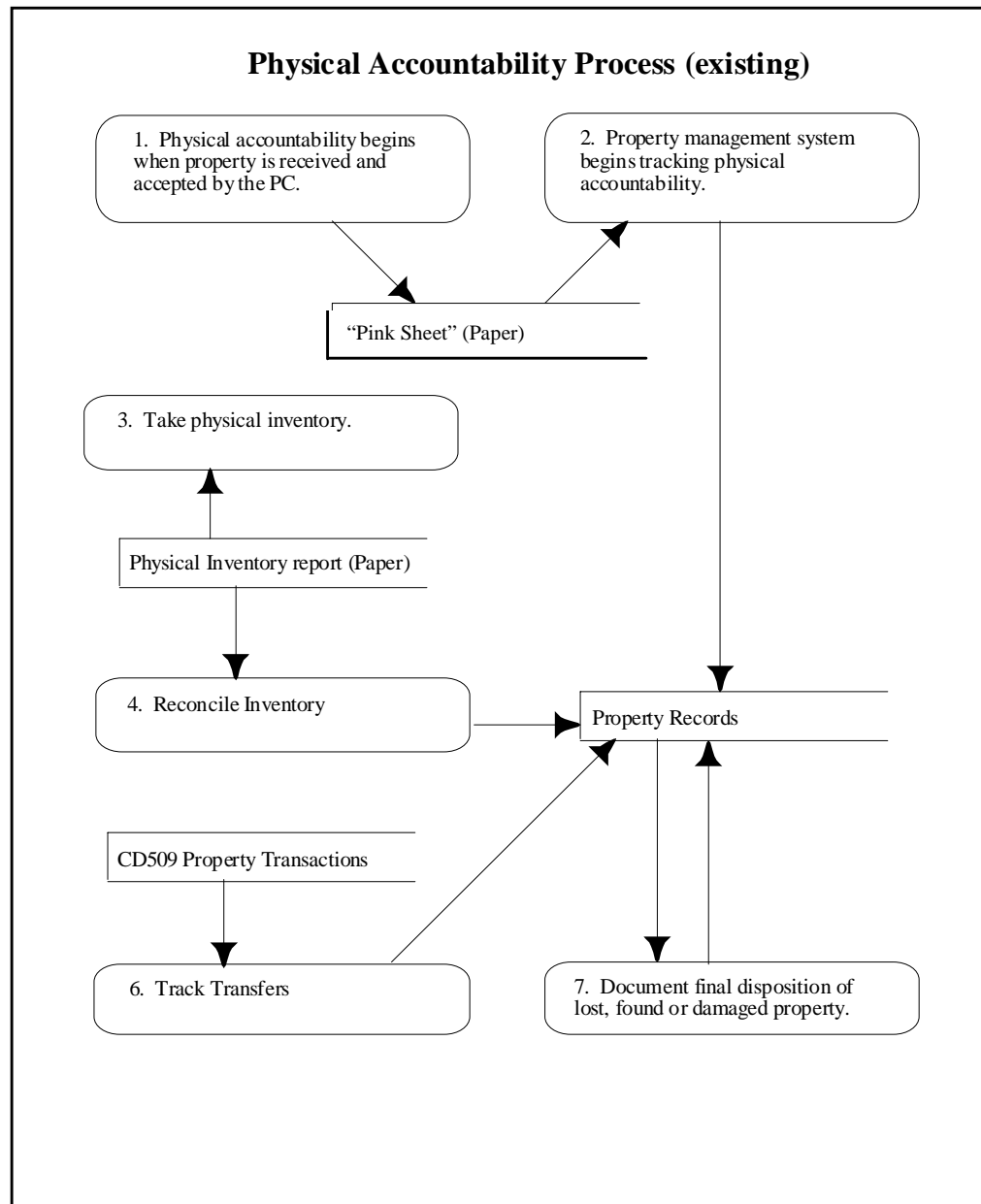
Physical accountability begins when the property is received and accepted.

Process Step	Current Process	Potential Process
1. Physical accountability begins	As soon as the property is received and accepted the property custodian is accountable.	No change
2. The property management system begins tracking physical accountability when property is acquired and a record is entered into the system.	When a PC returns the completed “pink sheet” (or its equivalent) to the Property Office the property record can be entered into the system. This is currently an issue, since there can be a substantial delay in this process.	The new system should create a skeleton property record earlier in the acquisition process, so tracking physical accountability should begin immediately when it is received by a property custodian.
3. Take physical inventory	Currently in the ASC’s a paper physical inventory report is produced for a custodial area at least once a year. The PC’s conduct a physical inventory and send the updated report back to the Property Offices. At headquarters, bar code scanners are used together with a software package which allows automatic updating of the inventory database and which, together with the NFC system, provides automatic reports of discrepancies in the physical inventories taken.	An on-line inventory report should be available to the PC’s that allows them to certify their inventory on-line. The new system should provide no less than the current functionality for the utilization of bar code scanners in conducting annual inventories.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
4. Reconcile Inventory	When the paper inventory reports are received by the Property Custodians, they have to be manually reconciled with the NFC property system and the discrepancies have to be explained (e.g. lost, found, broken)	The on-line UPR report should be reconciled with the on-line inventory report and the PC's and Property Offices should be able to reconcile discrepancies more efficiently.
5. Tracking Transfers	A CD509 Property Transaction form (paper based) is used by the PC's to record transfers between custodial areas. These obviously affect the inventory tracking of property. The NFC system maintains a complete history of every modification to the record affecting a piece of property.	Transfers should be done on-line between the losing and gaining PC's. This would allow the on-line inventory reports to reflect the transfers that have taken place. If an item cannot be found its history can at least be traced through the on-line system.
6. Document final disposition of found, lost and damaged property.	Refer to current disposal process.	Refer to potential disposal process.

NOAA - Property Management Requirements



NOAA - Property Management Requirements

Disposal Processes

When a piece of property is no longer needed or a custodial area is not using it for their own purposes the property can be disposed. The disposal process follows the standard DoC process for screening excess property as well as the GSA process for screening surplus property. Once a piece of property is identified as a candidate for disposal the screening and decision making process begins that will determine its outcome. Once that outcome is known the property custodian can dispose of the property in the dictated manner. If a piece of property is broken or lost it also needs to go through a formal disposal process.

Process Step	Current Process	Potential Process
1. A Property Custodian identifies a piece of property they would like to dispose of.	The property management office is notified via an excess property document and they manually gather the remaining information from the PC in order to begin the screening process. The information consists of condition codes, and details about the property (e.g. contains hazardous waste).	A new system should provide an on-line system so that a PC could identify accountable property for disposal and directly transfer the majority of the relevant information to the excess report.
2. The Property Offices screen the candidate property using the internal screening required by GSA.	The Property Offices must publish to the rest of the DoC what property is being disposed of. This is currently a paper based system.	The new system should automate the publishing of property that is available for re-utilization and re-distribution (e.g. Web page). This would eliminate the paper work and increase the chances of the property being used elsewhere within the DoC.

NOAA - Property Management Requirements

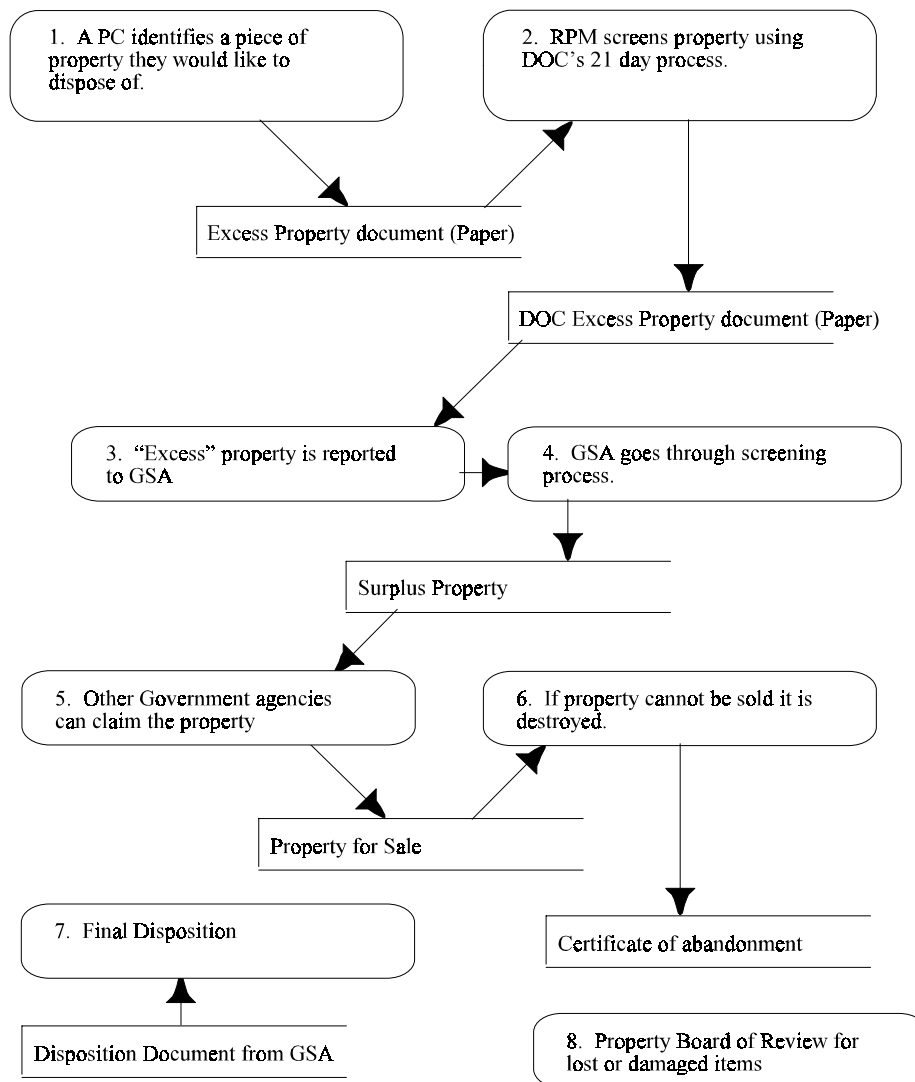
Process Step	Current Process	Potential Process
3. If a piece of property is not claimed within the 21 day screening process it is considered “excess” and is then reported to GSA and to the DoC if applicable or to the NOAA Warehouse at headquarters.	For all excess property a paper form is filled out and is sent to GSA or to the NOAA Warehouse at headquarters.	Hopefully an electronic reporting mechanism can be developed that allows the GSA or the NOAA Warehouse at headquarters to retrieve this information. There may also be an electronic reporting mechanism to report eligible property to the Computers For Learning Program.
4. GSA goes through the Federal Government screening process.	Other government agencies have 60 days to claim the property. Otherwise it is considered surplus. Once it is surplus it goes through donation screening for 2 weeks, where the “State Office for Surplus Property” can claim the property.	This won’t change since it is a GSA process.
5. If no government agency claims the property then it goes through the sales process.	GSA typically handles the sales process, but under certain conditions GSA allows specific items to be sold directly by the DoC.	There may be a system component that is necessary to handle NOAA coordinated sales. The value received for an item sold or exchanged must be recorded in the property system.

NOAA - Property Management Requirements

Process Step	Current Process	Potential Process
6. If an item cannot be sold it is then destroyed.	This requires a "Certificate of Abandonment and Destruction" to be sent to the PC's, which is posted in a public place. Some items that are large or contain hazardous materials can cost substantial dollars to destroy. These costs must be determined and tracked so a Board of Review can determine a course of action for the disposal of the property.	The "Certificate of Abandonment and Destruction" should be sent to the PC's electronically. The cost of destruction for a piece of property should be tracked in the system.
7. Final Disposition	A disposition document is sent back from GSA. The final disposition can take several courses of action. The Property Office is responsible for managing this process, with input from the line office (e.g. National Ocean Service).	The property system must record the final method of disposal used.
8. Property Board of Review for damaged or lost items	Damaged and lost items must go through the Board of Review process. For damaged items that a PM would like to cannibalize they submit a CD-52 form to the PAO for approval. The Board of Review then approves or disapproves the request. The Board of Review must also review all situations where property is declared lost.	This information should be entered onto the property record in the new system for audit purposes. As well, found items should go through a similar review process.

NOAA - Property Management Requirements

Disposal Process (existing)



NOAA - Property Management Requirements

Functional Requirements

This section describes the functionality that is required for the new property management system. The requirements are obviously stated at a very high level and will require further analysis to determine the detailed requirements necessary to design and build the system. These requirements do not represent the flow of information through the Property system. For that information please refer to the section in this document on Property management processes.

For each piece of functionality a priority has been assigned, which denotes its importance to the project. The following table defines each priority level.

Priority	Description
1	These are critical “Must Have” requirements. The system would not be feasible if this functionality was not automated. This also includes functionality that is a prerequisite for other priority ‘1’ requirements and needs to be there on day one when the system goes live.
2	These are “Should Have” requirements. Although the system could function with a manual process, the cost/benefit justifies that it is automated. This also includes items that do not have to be in place on day one in order to get the system up and running.
3	These are “Nice to Have” requirements. Before these are added a cost/benefit model should be developed to prove the requirement is feasible. If it is found that the function/feature is easily added to the system for a minimal cost it will be added, but otherwise the system will probably not have this functionality.

It should be noted that all automated processes should still have an equivalent manual procedure (E.g. paper forms) as backup in case of system failure or for those areas where system access is not available. As well it is expected that any priority 2 items that are not available on day one will have a manual process defined that allows the functionality to be performed outside of the system.

NOAA - Property Management Requirements

Acquisitions

Requirement	Priority	Comments
Bank Card Acquisitions.	1	
On-line review of bank card statement within CAMS that helps assign the proper object class.	2	
Interface sending bank card acquisitions from CAMS to the Property Management system.	2	If the CAMS bank card process is up and running then this will become a priority 1.
Produce an on-line Unreconciled Procurement Report.	1	

Property Custodians have an on-line process where they can reconcile acquired property and update the property record with the appropriate information.	1	
On-line maintenance process for Property Offices to review and maintain new property records.	1	
Purchase Order Acquisitions	1	
On-line review of Purchase Requisitions within CAMS by personnel in the Property Offices to help assign the proper object class.	2	
Interface sending Purchase Orders from CAMS and SPS to the Property Management system.	1	An interface has been built to the PRS System.
Produce an on-line Unreconciled Procurement Report.	1	
Property Custodians need an on-line process where they can reconcile acquired property and update the property record with the appropriate information.	1	

NOAA - Property Management Requirements

On-line maintenance process for Property Offices to review and maintain new property records. This should include the ability to split, combine or delete pending property records, since there is not a one-to-one relationship between PO line items and property records. It also includes the ability to associate multiple lines of accounting with a single property item.	1	
Contract Acquisitions	1	
On-line system for Property Offices to create initial property record after reviewing a contract.	1	
Property Custodians need an on-line process where they can reconcile acquired property and update the property record with the appropriate information.	1	
On-line maintenance process for Property Offices to review and maintain new property records.	1	
Acquisition by Transfer or Donation	1	
On-line system for Property Custodians and Contacts to review available excess within NOAA, within the Department, and from other agencies	3	Does not have to be integrated with the PPS, but should be accessed through common interface
Initial data entry occurs in the PPS. (Little data imported from other systems.)	1	
System should assist in the calculation of the value of the property based on current fair market value.	2	Calculation may be based on net book value from losing agency, their original acquisition cost, age of equipment, standard depreciation, or the value of similar items of similar age.

NOAA - Property Management Requirements

Leased Property	1	
On-line system for Property Offices to create initial property record for property acquired by lease.	1	
Capital leases recorded as acquisition on commencement of lease with proper calculation of value.	1	Value currently determined using Lease Determination Worksheet
Records of operating leases include beginning and ending dates and periodic lease charges.	1	
Loaned Property	1	
On-line system for Property Offices to create initial property record for property loaned to NOAA.	1	
Reminder when loan has expired to call the property back or renew the loan.	3	

Accountability

Requirement	Priority	Comments
Financial Accounting	1	
A feed-back mechanism is required to tell source systems (e.g. Purchasing) about mis-classified acquisitions.	2	
Depreciation on all capitalized property should be calculated and occur immediately upon date of acceptance.	1	
The costs associated with a property item needs to be maintained and adjustments sent back to the financial system.	1	
When payments are made within the financial system the property system should receive an electronic transaction.	1	

NOAA - Property Management Requirements

Modify depreciation for a property item when necessary (e.g. an upgrade is made to the property).	1	
Transmit depreciation amounts to the financial system on a regular basis.	1	
Produce annual Financial Statement and feed financial systems.	1	
Physical Accountability	1	
PC's should be able to produce an on-line inventory report that can be used to certify their inventory.	1	Provision must be made to permit accounting for property located off-site
There should be a reconciliation mechanism between the on-line inventory and UPR reports.	1	
A on-line property transfer mechanism should be available to the PC's which will include an active acceptance of the transfer by the gaining PC either by electronic signature or some other mechanism.	1	
A on-line process should be available to deal with "lost" and "found" property.	1	

Disposal

Requirement	Priority	Comments
An on-line function should be available for PC's to identify property for disposal.	2	
Publish an on-line list for the DoC that shows all property available for re-utilization and re-distribution.	2	
Provide excess property information to GSA electronically.	2	

NOAA - Property Management Requirements

On-line system for handling sale of property.	2	
Electronic posting of the "Certificate of Abandonment and Destruction".	2	
Maintain Board of Review information for lost, found or broken property.	2	

Ad-Hoc query environment

Requirement	Priority	Comments
Power users familiar with SQL should have a tool that allows them to extract data from the base data model.	1	This can be used to produce ASCII flat file extracts.
A data mart tool that allows users to use a drag and drop interface to create ad-hoc queries and reports without knowledge of SQL and the data model.	2	This tool would not allow for real-time analytical processing like a full-blown data warehouse environment would offer.

Barcode Application Layer

Requirement	Priority	Comments
-------------	----------	----------

NOAA - Property Management Requirements

The legacy bar code application that allows a hand-held scanner to count inventory needs to be integrated with the new system. It is currently comprised of a PC based application, interfaces to the legacy property system and the scanner application.	1	Basically the application is comprised of three components. The download of property records and reference tables to the scanner. The scanning of inventory and upload of that information to the PC. And the editing of this information and upload into the legacy (NFC) property system.
The minimum requirement is to keep the existing scanner and PC based applications and interface these with the new property system.	1	Integration with the new architecture may make this difficult.
Another alternative is to rewrite the PC based application so it is tightly integrated with the new system. This would probably require modifications to the scanner application as well.	2	

General Functions and Utilities

Requirement	Priority	Comments
Employee/User Maintenance. The employee table should be shared between the CAMS system and the Property system.	1	It should be feasible to have the Property system directly access the CAMS employee table, especially if they both use an Oracle RDBMS.
Code and Description table maintenance. Some of these code tables may be shared with other DoC and NOAA systems.	1	If these shared tables are maintained in another Oracle database it should be relatively easy to share this information.

NOAA - Property Management Requirements

Interfaces in and out of the system will require the ability to edit erroneous transactions and to detect and resend failed transmissions.	1	
Conversion utilities for moving property information from the legacy systems to the new system should be provided.	2	An automated interface should only be built if the effort can be cost justified. Otherwise manual conversion should be used.

NOAA - Property Management Requirements

Training

Requirement	Priority	Comments
A cost effective and efficient method for training users needs to be developed.	1	Options such as a “Train the Trainers” approach should be considered
The system should provide sufficient on-line and paper documentation so that a new user can use the core functionality of the system with minimal training.	1	

NOAA - Property Management Requirements

Technical Requirements

Specific requirements corresponding to each of the tiers in the technical architecture are described in this section. Only the major requirements are documented here. During detailed analysis and design of the system further requirements will be determined.

Priority	Description
1	These are critical “Must Have” requirements. This technology or component must exist in the technical solution.
2	These are “Should Have” requirements. Although options would be considered, this specific technology or component will need to be addressed within the system.
3	These are “Nice to Have” requirements that would only be considered if there was minimal cost or substantial benefit to having them.

Database Layer

Requirement	Priority	Comments
The database should be sized to store 100,000 property records and their associated information. History during the life of the asset plus three years, tracking every update at a column level, will also need to be stored.	1	
The transaction load on the database will need to be calculated so the database and server hardware can be sized and designed appropriately.	1	
Role based security within the database should be used to link application user security with database user security.	1	Roles need to be defined.
The database should be secured so that only specific users have read access when using query tools to access the database.	1	Only the property application should have Insert, Update and Delete access for the database.

NOAA - Property Management Requirements

All numerical data must be accurate to the sixth decimal place	1	
The system and database must support transaction logs to avoid data loss in the event of a system crash	1	(E.g. Oracle RDBMS archive log process)
Multiple versions of the database environment will be required during development, training and on-going maintenance.	1	
The data model should be fully normalized.	1	The only exception to this should be for performance reasons.
It is important that the Primary keys for the primary tables (e.g. Property) are system generated upon creation. This will allow records to be created when only a portion of the data is available. Multiple user friendly secondary keys should be utilized so users can query and access records using keys they are familiar with.	1	
Tables external to the property database should be shared and made available in read only mode to the system.	2	Database links and snapshots should be able to provide this mechanism when the external tables are stored in an Oracle RDBMS. Tables outside of Oracle will have to be accessed using another mechanism.

Application Layer

Requirement	Priority	Comments
Where possible all business logic should reside in a single centralized application layer.	1	

NOAA - Property Management Requirements

The transaction load on this layer must be determined to properly tune the software and size the hardware required.	1	
The content of the on-line help should be stored at this layer so it can updated globally.	2	
Certain functions may require that an alert or message be sent to a user. This functionality should be built into the application layer and potentially integrated with the NOAA mail system.	2	NOAA utilizes Netscape's mail server and mail client technology.
All inserts, update and deletions within columns and records within the database need to be audited and recorded with the date, time, user/process, comments, and transaction type. Screens and reports will be necessary to review and update these audit transactions.	1	Database triggers may be a possible solution for solving this.
Reports should be generated on the server and then the results distributed to the client workstations.	1	
It should be possible to schedule reports and other batch jobs to run at pre-determined times.	2	
Automatic distribution of reports to specific users should be available.	2	
Routing of electronic documents for approval.	3(2)	At a minimum, approvals will have to take place on-line.
Application security should be roll-based with a user being assigned to multiple rolls that in turn have access to specific screens and reports. A standard password format should be enforced along with a set expiry period.	1	Application users should use a user id and encrypted password to access the system.
Batch interface data being loaded into the system should be edited using the business logic contained in the application layer.	1	

Client Layer

NOAA - Property Management Requirements

Requirement	Priority	Comments
Graphical User Interface for all screens	1	
Web Enabled (I.e. browser based) interface.	2(1)	The ASC offices are connected to the WAN at higher speeds and have fewer users so a traditional client may suffice, but the benefits of using a Web based solution for the remote users probably makes it a priority 1 for them.
Field level versus screen/block level editing should be used.	2	Field level edits can be difficult with low-bandwidth web interfaces. See the technical architecture section of this document for further information.
On-line viewing and submission of reports. The reports will need to support various types of selection criteria (e.g. Date Ranges).	1	Output in HTML format via a Web server is probably the best solution for distributing and viewing reports.
Windows 95 based clients.	1	
Mac OS and Unix based clients.	1(2)	There are few Mac OS and Unix clients, but if a Web client is viable then it would be possible to utilize these workstations.

NOAA - Property Management Requirements

Supports Visually handicapped users.	1	NOAA has software that converts any text on a screen to voice so that visually handicapped users can make use of the system. This software will work with any application, but all GUI objects must display a text message when the cursor is placed over them so users can hear the voice message that explains the object.
Flat file extract to local workstation.	1	This feature should be part of the ad-hoc query tool.
The interface should allow a user to copy a previous record in order to reduce data entry by filling in fields on a new record.	1	
Users must be able to query records based upon criteria entered into multiple fields.	1	
On-line and context sensitive help should be available at all times.	1	
Meaningful context sensitive error messages must be displayed when an error occurs.	1	
The user should be able to take on-line content (e.g. report) and mail it to another user.	2	NOAA utilizes Netscape's mail server and client technology.

Infrastructure

Requirement	Priority	Comments
Network protocol is TCP/IP	1	

NOAA - Property Management Requirements

The remote users may be using dial-up network connections as slow as 28.8 Kb/s to access the WAN. The application needs to have adequate performance at this bandwidth.	1	
The maximum network packet latency across the WAN needs to be determined and the application needs to be designed to perform with this latency.	1	
Network printing	1	The network printers either support HP printer protocols or Postscript.
Local printing of reports	1	Some of the remote offices have locally attached printers. Additional printer queue technology would be necessary to allow server based reports to be routed to the print queue of a client.

NOAA - Property Management Requirements

Application Architecture

This section describes how the major components of the property management system will inter-relate with each other and the technology architecture.

Proposed Sub-Systems

There are three main functional areas that make up property management: Acquisition, Accountability and Disposal. For detailed information on the functionality of these please refer to the Current Business Processes and Functional requirements sections of this document. In order to support these functional areas a general utilities area that has functionality for items such as table maintenance, on-line help, monitoring batch jobs, and archiving of data will need to exist. The security layer must be integrated with all aspects of the functionality and provide the mechanisms to maintain user and application security.

Each functional area will be made up of a set of on-line functions (i.e. screens), pre-built reports, and batch/background processes. A graphical menu system will be required to allow users to navigate through the application.

The following diagram depicts how these areas inter-relate. The diagram shows that there are several pre-requisite pieces of generic functionality that need to exist before the core property management functionality can be developed.

Property Management Sub-Systems

Ad-Hoc Query Environment		
Acquisitions	Accountability	Disposal
User Interface		
External Interfaces		
Utilities		
Security		
Technical Architecture and SDE		

NOAA - Property Management Requirements

User Interface

It is important that the users have an efficient and consistent interface when interacting with the system. This means that all of the screens, menus, reports etc. within the application are well designed and follow a common set of standards. A workable prototype of the user interface should be designed and built early in the project in order to ensure it will be sufficient to meet the users requirements.

External Interfaces

The new property management system will have interfaces with several external applications. These interfaces should be fully automated background jobs that do not require any user intervention. They should be designed so that if one of the external systems changes there will be minimal rework required in order to accommodate the new system. In order to accomplish this an interface or integration framework should be utilized.

Most legacy systems have interfaces that are simply programs that extract data from a database and write to a flat file and then push the file across to another server where another program reads the flat file and writes the data into the database. This approach has several pitfalls in that if either system changes both sides of the interface have to change and if one of the steps fail it is difficult to detect and fix the problem.

A modern interface system will use some form of messaging that will help isolate the applications from one another so that most changes will only affect one side of the interface and also help guarantee delivery of messages between systems. The viability of building a modern interface mechanism should be evaluated. Usually the up front cost of these environments are quit high and the benefits are only realized once the system has been in production for a few years. As well, in order to realize the full benefit of these mechanisms the systems on both sides of the interface need to take advantage of a message based architecture.

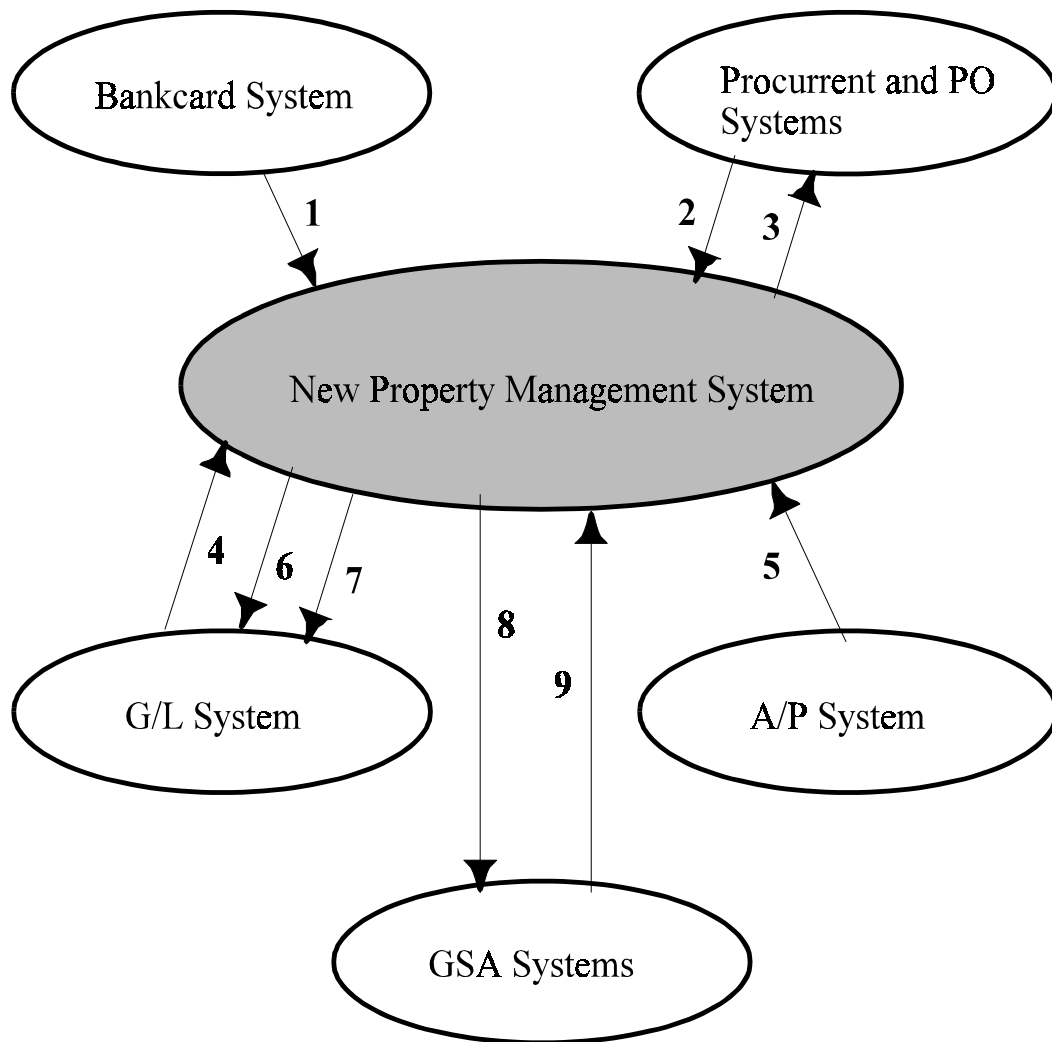
The following interfaces need to be addressed (see diagram below).

1. The bank card system (in CAMS) should feed the property system with acquisitions made on a bank card. The bank card system within CAMS will have a property module where property purchases can be reviewed on-line before being transferred to the property system.
2. Purchase Orders for property should flow from the procurement and purchasing systems (CAMS, Small Purchasing System) through to the Property system. It is important that these transactions include the proper coding (e.g. custodial Area, object code) as they will be used to create property records.

NOAA - Property Management Requirements

3. The new system should catch mis-classified purchases and feed that information back to the procurement and purchasing systems.
4. The cost of property can be adjusted in the system and these adjustments must be sent back to the G/L system. In the short term the G/L will still reside in FIMA, but it will moved to the CAMS system so this interface will definitely go through a change.
5. As payments are made from the A/P system they need to be sent to the Property system.
6. The new Property system should automatically calculate depreciation on capitalized property and send this information to the G/L.

External System Interfaces



NOAA - Property Management Requirements

Utilities

All systems require utility programs that are necessary to keep the system in working order. These include such functions as archiving historical data and maintaining users and their security access. Typically only the system administrator will make use of these functions and they are used infrequently.

Security

Security within a system takes place at several levels. The system will need to address operating system, database and application level security. In some environments it is possible to combine these together so that when a user logs into the operating system the database and application use that information for their security authentication as well. At a minimum the application security should follow a role based model, where a user may be assigned multiple roles and each role is granted access to specific functionality within the application.

Ad-hoc queries

It is a requirement that data can be extracted out of the property database in order to produce ad-hoc reports and data file extracts to feed other applications. The purpose of the ad-hoc query/extract and the technical competence of the person performing the extract will determine the tool and functionality necessary to meet these requirements. It will probably require separate software tools to meet the requirements of a power user writing SQL queries to produce a file extract versus a casual user wanting to generate an ad-hoc report.

NOAA - Property Management Requirements

Technical Architecture

The technical requirements (see requirements section) for the new property management system lend themselves to implementing a 3-tier architecture. The key technical constraint driving this is the fact that a large number of the Property system users (I.e. Property Custodians) are in remote offices that have low-bandwidth and high latency WAN connections. A traditional two-tier architecture would be very slow and potentially unstable across these WAN connections, whereas a well designed 3-tier architecture reduces the amount of network traffic at the client. This section describes the major components that need to be addressed in a 3-tier architecture and how they inter-relate.

The three main layers of a 3-tier architecture are the database server layer, the application or business logic server layer and the client or presentation layer. All of these layers/tiers require hardware and software components and a network infrastructure to tie them together. As well all three tiers need to be able to recover from a disaster or failure of part or all of the system. A legacy bar code application for tracking inventory also needs to be incorporated into this architecture. Each of these components are discussed below.

Database Server Architecture

The database layer/tier will need to be a centralized database where all data for the property management system will reside. The only requirement for distributed data is for some shared tables such as the employee table(s) that currently reside in other DoC systems. If these tables reside in an Oracle database then they should be tightly integrated with the property system. If not then an interface will be required to refresh this data on a timely basis. The data volume and transaction volume for the property system are very low so there should be no issues with the RDBMS for this tier. The database product chosen should be one that supports industry standards such as SQL and can be accessed through both proprietary and open database connectivity tools (E.g. ODBC). The other systems within NOAA and the DoC currently use an Oracle RDBMS as their database and this should be the first choice for building this system.

Application Logic Architecture

The middle tier of a 3-tier architecture is where the majority of the application/business logic is executed. It takes requests from the client side of the application and processes them by accessing the database server tier and returns results back to the client. The reason this is important is that the majority of the network traffic is generated when the application is validating business rules against the database. If the application logic was on the remote client

NOAA - Property Management Requirements

workstation then as it executed against the database it would generate a great deal of traffic between the client and the database and result in slower performance. Another benefit of having this middle-tier is that the application can be run on one or at worst a few shared centralized servers. This makes software updates substantially easier than trying to update hundreds of workstations in remote sites.

It should be noted that it is possible to move components of the application tier inside the database tier and have the RDBMS share some of the load for executing business logic. This usually improves performance since the business logic is executed within the RDBMS, which eliminates the need for network communications. The downside of this is that the database server needs to be larger and depending upon the technology chosen may restrict the scalability of the application.

Client (user interface) Architecture

Since many of the client workstations will be connected over low-bandwidth and high latency connections it is important to reduce the amount of network traffic to the client. At a minimum the client needs to handle the graphical user interface (GUI) of the application which is comprised of displaying data, accepting data input and navigation through the application. Quite often it makes sense for the client tier to also handle some of the simpler business logic such as data type edits (e.g. date formats), but these capabilities are usually dictated by the technology being used.

The selection of the client architecture will be critical to the Property system. Care should be taken to match the technical requirements with the capabilities of certain technologies. The best example of this is pure Web-Based applications running inside of a Web-Browser. This technology is making significant strides and is quickly becoming a mainstream technology, but it still places restrictions on the functionality of the client. In particular these Web-Based applications have difficulty matching the performance of a client/server LAN based application and to overcome this performance problem functionality is often removed. The most common type of functionality to be removed are features such as field level edits where when the user enters data in a field, business logic is immediately executed and validation occurs before the user moves to the next field. Instead most Web-Based applications use “Block” or “Screen” based editing where the user enters data into all the fields on the screen and then submits the entire “Block” for editing, which is similar to how legacy mainframe based applications work today. It is essential that before committing to any particular technology that all of the pros and cons are understood in detail.

NOAA - Property Management Requirements

Barcode Architecture

The legacy barcode application is comprised of an application running on existing PC's, the application running on the scanners and the interfaces between the PC, the scanner and the legacy property system. The interfaces are simply ASCII flat files that are being downloaded to the PC and scanner and then returned from the scanner to the PC for editing and upload into the legacy system. The barcode scanner hardware will not be changed or upgraded and the application on the scanner at most will have to be modified. The PC based application however may have to be rewritten, depending upon the difficulty of interfacing it with the new architecture. Obviously the interfaces between the PC application and the new property system will have to be redeveloped.

Network and Communications Infrastructure

In order for the 3-tiers of the architecture to work they need to be tied together with a communications infrastructure. They all must reside on a common wide area network that allows the hardware and software on each tier to pass data back and forth. The property management system will reside on the DoC WAN which is comprised of Frame Relay based fractional T1 connections (256 Kb/s) between the ASC offices and the NOAA servers in the Washington D.C. area. Most of the remote locations outside of the ASC offices currently require dial-up access to the WAN so the maximum bandwidth available at these sites should be assumed to be 28.8 Kb/s.

It is important that the database tier and the application tier are connected at very high speeds since they will require a great deal of interaction. The 28.8 Kb/s bandwidth constraint for the remote client tier is probably the most difficult obstacle to building a fully functional 3-tier architecture. This bandwidth constraint must be tested early in the project in order to determine the viability of any proposed 3-tier architecture.

Hardware Components

Each of the 3 tiers will have different hardware requirements. The exact requirements will have to be determined during detailed analysis and design of the system but it is important to understand the basic type of hardware required as early as possible.

The database tier will require a server class machine and operating system that supports the chosen RDBMS. The DoC and NOAA currently use Unix based servers to host their Oracle databases and this should be the recommended solution for the Property system as well. It is also recommended that a dedicated server be used to host the new Property system so that the performance of other applications cannot degrade the Property system.

NOAA - Property Management Requirements

The application tier in a 3-tier architecture is difficult to size until the technology is known and some preliminary performance benchmarks are completed. Since this is the case, it is important to select an architecture that supports multiple servers working together as a cluster. This allows the capacity of the middle-tier to be easily expanded as functionality and users are added to the system. It is usually the software tools and software technology selected to build the middle-tier that dictate the type and size of hardware and operating system required for this tier.

Since the Property system will run on the existing client workstations already deployed in the field it is important to determine the minimum and type of hardware configuration that already exists. The minimum configuration of the clients can have a big impact on how the application is designed and almost every aspect of the client technology such as screen resolution (e.g. 800x600), CPU, memory can severely limit the capabilities of the application. The good news about a 3-tier architecture is that the client requirements are usually less than a 2-tier, with screen resolution being the only exception.

Software Components

A 3-tier architecture is comprised of a large number of software components, with interaction between components at several levels. At a minimum each hardware platform will require an operating system and run-time environment for the portion of the application that is being executed on it. The database tier will obviously have the RDBMS software running on it, but may also have such components as external interface applications. Reality will be that each tier will have several run-time environments usually with separate products required for screens, reports, batch programs, utilities etc. The underlying communication infrastructure also requires software so that the client, application and database tiers can communicate effectively. Great care is required to select products that are compatible with one another and can be easily installed and upgraded in the future. The software development tools (see SDE section in this document) used to build the application will dictate the run-time environment that will be required for the application. A poor choice of tools can adversely affect the overall performance and stability of the system.

Disaster Recovery Components

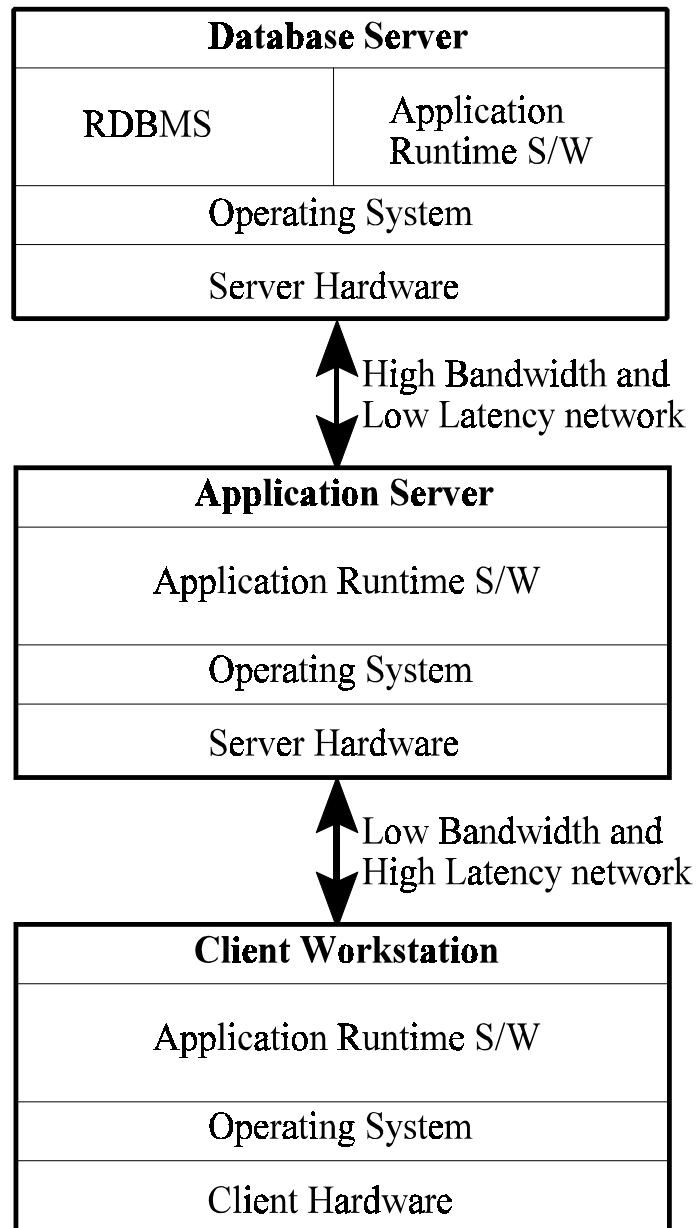
All systems require the ability to recover from a disaster and each component of the technical architecture has the potential to fail. The key questions are “How much data is it acceptable to lose in the event of a disaster?” and “What is an acceptable downtime to have during recovery from a disaster?” It is the answers to these questions that dictate how robust the disaster recovery architecture has to be.

NOAA - Property Management Requirements

Data loss is usually the worst disaster that can happen to a system. Modern database and server hardware technology has almost eliminated the potential loss of data in applications by allowing for the creation of redundant copies of all transaction data. If a failure occurs then there is usually multiple copies available to restore the database from. At a minimum the database should be making multiple copies of all transactions on separate disk drives and if financially feasible the operating system should be doing the same. It is also critical to make periodic backups of the database and keep a copy off-site in order to mitigate the risk of an entire system being destroyed (e.g. computer room fire). In the event of most failures database recovery can usually be completed in a few hours with recovery back to the point of the last successful transaction and in some cases with no downtime for the rest of the application.

For those failures that don't involve data loss, but instead infrastructure (e.g. communications and server hardware) then a cost benefit analysis has to be conducted to determine the best level of disaster recovery. These types of failures occur less often, but usually require repair and replacement of hardware components and cause substantial down-time if the parts are not available. Most hardware manufacturers will provide hardware support contracts that will guarantee they can fix a hardware problem in a given time frame.

Technical Architecture



NOAA - Property Management Requirements

Architectural Risk

The choice of architectures is critical to the success of a project. If a set of unproven or “bleeding edge” components is used then risk (e.g. time and dollars) increases dramatically. For a system such as the NOAA Property system there should be no reason to use unproven technologies.

There are always new technologies being released that look very appealing to both business and technology focused resources and definitely many will extensively be used by organizations in the future. It is always important to incorporate good technology with a long life span into a system. However, it is these new bleeding edge technologies that can lure a project into spending time and money doing technology R&D. Don’t completely eliminate new technologies, because timing is everything with them and what is unproven and unstable today may be completely safe to use six months from now. In order to avoid the pitfalls of using risky technology a simple methodology should be followed. That methodology is to only select technologies where there is substantial proof (e.g. client references and demonstrations of production systems) that the technology has been successfully implemented in a architecture similar if not identical to NOAA’s. If a software or hardware supplier cannot provide real-world references and supporting proof that a technology is in production then their product should be eliminated from consideration.

If for some reason two or more pieces of technology are being integrated for the first time then it always make sense to test this integration in a proof of concept scenario as early in the project as possible. It also recommended that a prototype of the user interface be built so that users can buy into the look, feel and general performance of the application early in the project.

NOAA - Property Management Requirements

Software Development Environment Requirements

In order to have a successful project and system a proper Software Development Environment (SDE) needs to be utilized. The DoC does maintain some SDE's for Oracle based development and these should be utilized if feasible. All of the following requirements need to be addressed within the SDE. All of these are "Must Have" requirements and need to be dealt with; however not all of them will need to be automated and instead can be handled with manual procedures.

SDE

Requirement	Priority	Comments
Analysis tools	1	A computer aided system engineering (CASE) tool should be utilized for systems analysis.
Design tools	1	A CASE tool should also be able to help with design along with prototypes etc.
A software development tool set will be required that includes products for building the user interface, application logic, reports, database objects, batch programs and utilities.	1	
Documentation and training aid development tools	1	
Software testing tools and procedures	1	
Source code and version control tools	1	These tools and procedures need to be fully fault tolerant against all forms of disaster, with no chance of source code ever being lost.
Fault tracking tools and procedures	1	
Adequate development hardware (servers, clients, printers etc.) and infrastructure (networks, modems) need to be available.	1	

NOAA - Property Management Requirements

Proper standards must be used and enforced for the following: analysis, design, coding, GUI, reports, data modeling, database implementation, security, documentation and testing.	1	Existing standards within the DoC and NOAA should be utilized wherever possible.
--	---	--

NOAA - Property Management Requirements

Glossary

ASC – Administrative Support Centers

CAMS – Commerce Administrative Management System

FIMA - The current financial system that will be replaced by CAMS

NFC – National Finance Center (existing Property Management System)

PAO - Property Accountability Officer

PC – Property Custodian

PP - Procurement Point

PRS – Property Reconciliation System. (A system in use at the ASC's to track and reconcile PO's)

RPM - Regional Property Manager and Offices (4 ASC's + headquarters)

UPR – Unreconciled Procurement Report

WASC - Western ASC office

Product Service Code - Term used in the Procurement System for the Federal Supply Classification Code

Federal Supply Classification Code - A four-digit number assigned by the Defense Logistics Agency to general classifications of personal property.